Consistent hydronic control
Continuous energy savings

AB-PM automatic balancing valve – for a reliable and energy-saving heating system.

1 valve
needed instead of 3
for pressure, flow
and zone control of
water-based heating
systems.
Three functions one valve

The ideal residential heating solution is reliable and easy to maintain. A solution that helps to reduce heating costs, improve indoor comfort and eliminate noise. Danfoss has developed a new type of balancing valve that can do all these things.

The AB-PM valve is a combined automatic balancing valve. It incorporates a differential pressure controller, a flow limiter and a zone controller. All three functions in a single valve.

AB-PM is simply the perfect solution for:
- Horizontal two-pipe radiator systems
- Floor heating systems.

The AB-PM valve converts an unbalanced variable flow system into a reliable and balanced heating system with proper heat distribution, even at partial loads. Thanks to the stable low differential pressure across all the thermostatic radiator valves, the heating system also becomes noise free.

The zone controller function makes it possible to control room temperature when at home or during the night. This is done by connecting an on/off actuator and a room controller to the valve, resulting in energy savings and improved indoor comfort. During holidays, the zone valve can be used to ensure that the radiator or floor heating system provides a minimum temperature needed to protect the water-based pipe system from frost.

The AB-PM valve effectively replaces three separate valves. With its compact design, it is easy and fast to install and ideal for small spaces, such as in manifold cabinets.
Using our sizing and selection table, you can quickly install and preset the AB-PM valve, without the need for complex calculations. Simply determine the required flow and differential pressure in the riser and preset AB-PM accordingly. AB-PM will take care of the rest, without further commissioning. It’s that easy.

**AB-PM selection is based on:**
- required flow in riser / loop - (l/h)
- required differential pressure in riser / loop - (kPa)

**Setting**
Setting AB-PM is quick and easy without complicated calculations. Simply set the knob to the desired value, based on the required flow and differential pressure in the loop.

**Installation – simply quicker and easier**
With AB-PM, you only need one valve instead of three separate valves. This will significantly reduce installation time and labor costs. You will also need fewer fittings and tailpieces. Once AB-PM is installed and preset, there is no need for further commissioning.
Recommended application 1

Horizontal two-pipe radiator system

Description

In new multi-residential buildings, a horizontal two-pipe radiator system typically features an individual connection for each apartment. At a central point in the apartment, a cabinet is installed with a manifold where all connections come together. This way the energy consumption can be controlled for each apartment. The thermostatic valves on the radiators convert heating systems from a static to a dynamic, variable-flow system. When renovating, conventional systems with individual boilers in each apartment can be replaced with central boilers for increased efficiency. Each apartment retains the original piping but will now have its own connection.

How does AB-PM benefit you?

AB-PM installed in a two-pipe radiator system provides stable pressure for the thermostatic radiator valves, helping them perform better and eliminating noise problems. It also provides flow limitation for simple and accurate balancing for each individual apartment. By adding an actuator (TWA-Z) to the AB-PM, connected to a room controller or timer, additional functions such as zone control, night set-back or vacation mode are possible.

End-users benefit from a reliable heating system, even heat distribution and reduced energy consumption.

**Recommended application 1**

**Horizontal two-pipe radiator system**

**Design complexity**

Low/medium

**Initial investment**

Medium

**Operational cost**

Low

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**AB-PM**: Pressure differential controller with flow limitation and zone control

**Adapter**: Impulse tube connection piece

**SV**: Shut-off valve (MSV-S)

**TRV**: Thermostatic radiator valve

**PRC**: Programmable room controller or timer

*For each room, only one control element (PRC or TRV) should be used to ensure proper temperature control function.*
Floor heating systems are rapidly gaining in popularity, thanks to their ability to provide improved comfort at lower energy consumption levels than traditional heating solutions. These systems generally have a manifold with one loop available for each room. With a room thermostat in each room, the indoor temperature is controlled via the zone valve on each loop. This turns the system from a static into a dynamic, variable-flow system, which requires automatic balancing. Placing an AB-PM valve in front of the manifold delivers automatic balancing for each apartment, independently of other apartments in the same building.

How does AB-PM benefit you?
Thanks to the integrated differential pressure controller, AB-PM helps in avoiding common problems such as uneven heat distribution and interference between apartments in the same building by ensuring the correct flow, no matter what the load in the system is. AB-PM’s easy-to-use flow limitation function ensures proper balancing throughout the heating system and also offers the possibility of zone control.

End-users benefit from a stable and energy saving system.
Danfoss has tested the AB-PM differential pressure controller with flow limitation in combination with TWA-Z for zone control and a QT thermostatic element to control return temperature in one-family house heating applications.

The test was carried out on five similar one-family houses, located in one neighborhood in Aarhus, Denmark. All five houses are connected to the district energy system for hot water and heating. In three of the five houses, an AB-PM valve was installed to replace the original differential pressure controller in the heating system. The other two houses were left untouched to act as a reference.

Test case consists of a total of five houses:

1 house: installed with AB-PM + TWA-Z actuator for zone control

2 houses: installed with AB-PM + QT thermostatic element for return temperature control

2 houses: no changes made to original system – used as reference

Significant benefits using AB-PM solution in Aarhus, Denmark

Very promising

The first results, measured from winter 2011 until spring 2012, show significant reduction in energy consumption compared to the reference houses, with variations of between 7-18% per month. More thorough testing is needed to draw definite conclusions and to see how these differences can be translated into energy savings. So far, however, the use of AB-PM in one-family house heating applications appears to offer significant energy reduction potential.
### Maximum flow

<table>
<thead>
<tr>
<th>Type</th>
<th>DN 15 at 100% setting</th>
<th>DN 20 at 100% setting</th>
<th>DN 25 at 100% setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qmax</td>
<td>300 l/h at 10 kPa</td>
<td>600 l/h at 10 kPa</td>
<td>1200 l/h at 10 kPa</td>
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</table>

### Partner valve

<table>
<thead>
<tr>
<th>Type</th>
<th>DN</th>
<th>Connection (ISO 228/1)</th>
<th>Code No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSV-S</td>
<td>15</td>
<td>G ¾* (ext. thread)</td>
<td>003Z4111</td>
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<tr>
<td></td>
<td>20</td>
<td>G 1¹* (ext. thread)</td>
<td>003Z4112</td>
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<tr>
<td></td>
<td>25</td>
<td>G 1¼ (int. thread)</td>
<td>003Z4013</td>
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</tbody>
</table>

- Impulse tube connection piece: ¾ - ⅛

**AB-PM**
- **Type)** DN 15
- **Connection (ISO 228/1)** G ¼ A
- **Code No.**: 003Z1402

### Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>To pipe</th>
<th>To valve</th>
<th>Code No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tail piece threaded</td>
<td>R ½</td>
<td>DN 15</td>
<td>003Z0232</td>
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<tr>
<td></td>
<td>R ¾</td>
<td>DN 20</td>
<td>003Z0233</td>
</tr>
<tr>
<td></td>
<td>R 1</td>
<td>DN 25</td>
<td>003Z0234</td>
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<tr>
<td>Tailpiece welding</td>
<td>DN 15</td>
<td>003Z0226</td>
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<td></td>
<td>DN 20</td>
<td>003Z0227</td>
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<td></td>
<td>DN 25</td>
<td>003Z0228</td>
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<tr>
<td>Tailpiece soldering</td>
<td>DN 15</td>
<td>003Z7017</td>
<td></td>
</tr>
</tbody>
</table>
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**Hydronic Balancing & Control**
Specific information about hydronic balancing & control valves can be found at: [www.hbc.danfoss.com](http://www.hbc.danfoss.com)